

Giovanni 3.0.8 has been released!

We've made several changes to the Giovanni interface to improve the "user experience" with Giovanni. Here are short descriptions of what to look for:

One of the most important changes users will note in Release 3.0.8 is that the visualization (plot) preferences are now available on the same page where the initial spatial, temporal, and data set selections are made. Previously, user plot preferences could only be entered following the generation of a visualization using default settings. In this release, plot preferences can be entered before generating an initial visualization. Furthermore:

- the Plot Preferences panel that the user sees will be based on the selected visualization type; and
- the Plot Preferences panel can be easily opened or closed.

The spatial selection map has several new features that should make it easier to use and allow the quick selection of different mapping criteria. The new features include:

- new icons for map controls;
- an easier-to-use map zoom capability;
- different selectable layers: country names, state names in the United States, and political boundaries; and
- controls for quick centering on the Greenwich Meridian or International Date Line.

Also in Release 3.0.8:

- ❖ Several enhancements have been made to improve the compatibility and usability of Giovanni with Internet Explorer.
- ❖ Once a user makes a map selection, it will persist for subsequent queries.
- ❖ The user selection map now works better for selected areas that cross either the Greenwich Meridian or International Date Line.

Were you aware... ?

In October 2008, three teams from the GES DISC received Robert H. Goddard Honor Awards. One of these awards recognized the team responsible for the successful implementation of Giovanni and Mirador. **Mirador** is the GES DISC's cutting-edge data search and access system.

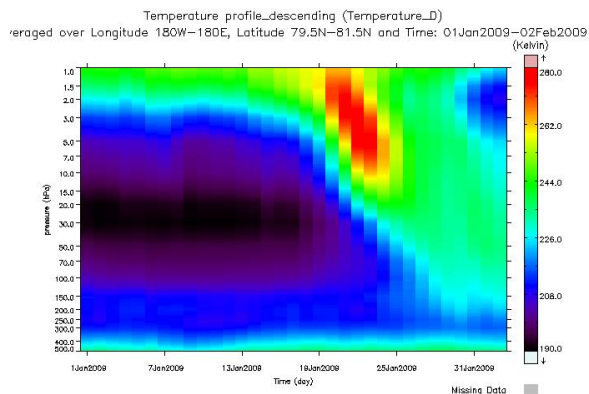
AIRS Data in Giovanni Enable Visualization of "Sudden Stratospheric Warming" Event

(from the GES DISC News Archive on the WWW)

The wintertime Arctic polar stratosphere is usually characterized by a broad circumpolar jet stream (the polar vortex). Every few years, large-scale weather systems or waves move upward from the troposphere into the stratosphere and interact with the polar vortex. This wave-vortex interaction results in a sudden rise of stratospheric temperature by tens of Kelvin, the so-called Sudden Stratospheric Warming (SSW). This stratospheric warming is usually accompanied by a slowdown or even a reversal of the jet stream.

A major stratospheric warming occurred and persisted during the last week of January 2009. The Giovanni system was utilized to capture the evolution of the stratospheric warming event over time using Atmospheric Infrared Sounder (AIRS) data. As can be seen from the time vs. pressure cross-sectional view of AIRS daily temperature data shown below, the warming started at the stratopause level (near 1 hPa or about 48 km altitude), and around the end of January 2009, penetrated down to the lower-stratosphere (200 hPa or 12 km). Long-range weather forecasters attempted to predict how this January event would influence February winter weather in the Northern Hemisphere.

AIRS data are plotted below for the northern polar region in a latitude band between 79.5° N and 81.5° N. The warming event (reds and yellows indicating a temperature range between 250-280 kelvins) is observed commencing about January 18-19.



The time scale goes from early January on the left side of the plot to early February on the right. The pressure range is from 500 to 1.0 hectoPascals (hPa). The approximate location of the boundary between the troposphere and the stratosphere, the tropopause, in hPa is 300-350 hPa in the polar regions; in km, the tropopause is found at an altitude of about 10 km over the poles. (900-1000 hPa is atmospheric pressure at sea level.)

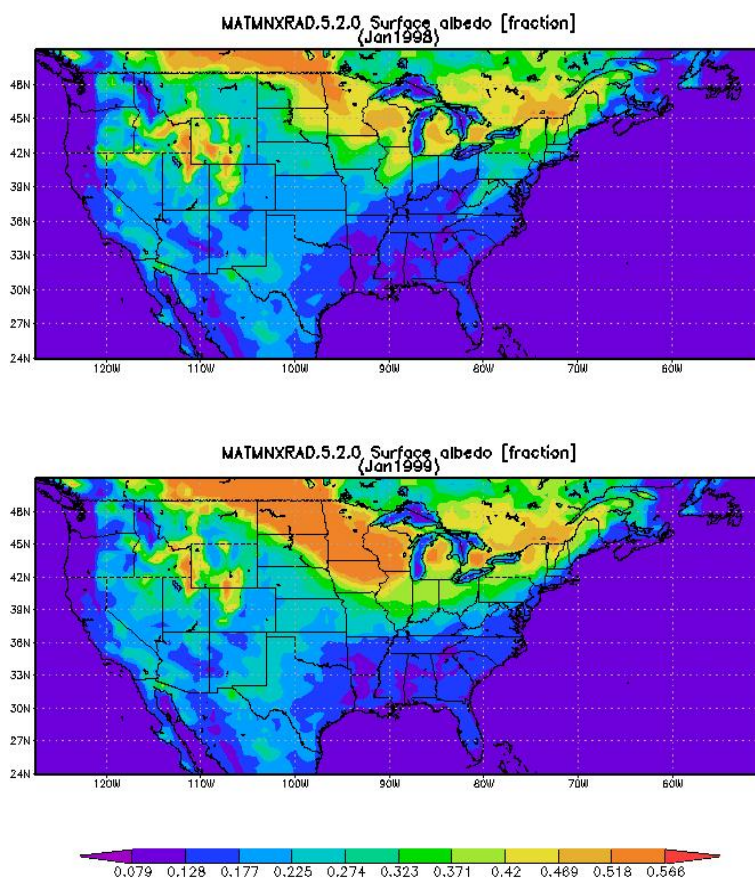
MERRA Data Expand the “Reach” of Giovanni

The newest instances of Giovanni are the MERRA 2D and MERRA 3D instances. MERRA stands for “Modern Era Retrospective-Analysis for Research and Application”, and is a project of the NASA GSFC Global Modeling and Assimilation Office (GMAO), funded by the NASA Modeling Analysis and Prediction (MAP) program.

MERRA utilizes data from several sources, including the Earth Observing System (EOS). What MERRA provides over a nearly 40-year period is a multitude of meteorological and climate variables. Many of these variables are diagnostic of atmospheric processes, which is why there are two MERRA instances: one for mapped or two-dimensional variables (2D), and the other which includes variables with atmospheric profiles, i.e., three-dimensional (3D). MERRA features data at high spatial resolution and very high temporal resolution – in some cases, 1 hour or 3 hour resolution.

The current Giovanni instances serve the MERRA monthly data. Giovanni’s existing analysis and visualization capabilities can be utilized on the wide variety of MERRA data products, allowing insight into weather and climate processes, particularly those related to the water cycle, such as clouds, winds, and radiation.

Below is a comparison of two Giovanni map plots of a familiar variable in MERRA, surface albedo. The comparison is of January 1998 (top) and January 1999 (bottom). During January 1998, a strong El Niño (warm phase) was taking place in the Pacific Ocean; during January 1999, a La Niña (cold phase) condition was present. The effects on winter weather and snow cover in the United States are apparent in these two plots.



It is important to note that these plots depict surface albedo for the *entire month* of January. There might not have been snow on the ground over the entire area with higher albedo (yellow and orange colors) during all of January; but with more snow and lower temperatures, snow was likely more persistent during 1999, with La Niña exerting a considerable influence on the weather, than in 1998, when El Niño was a dominant factor.

In addition to the noticeable broader swath of higher albedo in the northern Midwest in January 1999, there is higher albedo in upstate New York and in the area from Illinois to Pennsylvania. There are some places where albedo is elevated in 1998 compared to 1999, such as northern Nevada, southern Wyoming, and the southern Blue Ridge mountains (West Virginia and western Virginia). Higher albedo in the western mountain ranges in 1998 could be attributable to strong El Niño storms responsible for depositing increased snowfall on the higher elevations.

So even this “quick look” at MERRA data in Giovanni demonstrates how climate information can be derived from these new Giovanni instances.

Citizens and Remote Sensing Observational Network (CARSON) Project: Kick-off meeting May 19 in Baltimore

The Citizens and Remote Sensing Observational Network (CARSON) Project, which seeks to connect citizen scientists and their observations of their local environment with NASA remote sensing data available in Giovanni and NASA Earth Observations (NEO) will hold its kick-off meeting at the Maryland Science Center in Baltimore on May 19 at 7:00 PM. CARSON is creating three Web modules on Air Quality, Water Quality, and Precipitation that can be used by participants. The CARSON pilot project in Baltimore will help determine how CARSON can eventually be expanded nationwide.

To find out more about CARSON at the Maryland Science Center, go to the Web site:
<http://www.marylandsciencecenter.org/exhibits/Carson.html>

MODIS-Aqua Collection 5.1 Data now available in Giovanni

MODIS-Aqua Collection 5.1 data are now being incorporated into the Giovanni system, as they are received from the data provider (MODAPS). There may still be a few data gaps as this process continues until all of the data have been delivered.

Here is a short description of the changes in the Collection 5.1 data:

- improvements to the Deep Blue Aerosol retrieval;
- improved (non-Lambertian) parameterization of the surface BRDF effect;
- cloud screening and QA/QC flag selection leading to improved accuracy over bright reflecting surfaces; and
- a fix to the Rayleigh correction code that was causing some dropouts of the Cloud Optical Thickness retrieval over land.

The Deep Blue Aerosol Optical Depth at 550nm (Land) is currently only available in the MODIS Terra and Aqua Level 3 Daily instance. This data product will be available in the MODIS Terra and Aqua Monthly Level-3 Data instance in the future.

Recent Research Publications

Shen, S., Leptoukh, G., Loboda, T., Csiszar, I., Romanov, P., and Gerasimov, I., "The NASA NEESPI Data Portal to Support Studies of Climate and Environmental Changes in Non-boreal Europe". In: *Regional Aspects of Climate-Terrestrial-Hydrologic Interactions in Non-boreal Eastern Europe*, Groisman, Pavel Ya and Ivanov, Sergiy (Eds.), Springer, 2009, 255 p., pp 9-16.

Immerzeel, W.W., Rutten, M.M., and Drooger, P. (2009). Spatial downscaling of TRMM precipitation using vegetative response on the Iberian Peninsula. *Remote Sensing of Environment*, **113**(2), 362-370.

Borges, A.V., Ruddick, K., Schiettecatte, L-S, and Delille, B. (2008). Net ecosystem production and carbon dioxide fluxes in the Scheldt estuarine plume. *BMC Ecology*, **8**:15 doi:10.1186/1472-6785-8-15.

Kamykowski, D. (2008). Estimating upper ocean phosphate concentrations using ARGO float temperature profiles. *Deep Sea Research Part 1*, **55**(11), 1580-1589.

Perry, M.J., Sackmann, B.S., Eriksen, C.C., and Lee, C.M. (2008). Seaglider observations of blooms and subsurface chlorophyll maxima off the Washington coast. *Limnology and Oceanography*, **53**(5, part 2), 2169-2179.

Adding Variety to Visualizations:

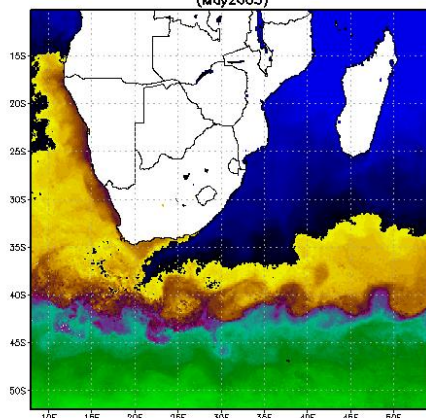
Color Palette Options in Giovanni

Although it is possible to find data map visualizations that use different color palettes, versions of the familiar "rainbow" color palette are very common. Giovanni, in fact, uses the rainbow color palette as its default option for latitude-longitude map plots. Because the rainbow palette is familiar to researchers (and reviewers), many Giovanni users tend to keep using it.

However, Giovanni provides many other color palettes that are available in IDL (Interactive Data Language). Sometimes, a little experimentation can produce striking and useful results.

The plot below is of MODIS-Aqua (Moderate Resolution Imaging Spectroradiometer) sea surface temperatures around South Africa, depicted using the IDL "Beach" palette. There is a wide temperature range here, and the sharp color boundary which falls, somewhat by accident, at about 20° C delineates warm Indian Ocean waters (colored black and blue) and the southward-flowing warm Agulhas Current. Other current boundaries and eddies are seen further south, and the Benguela Upwelling on the southwest coast of South Africa has cooler upwelled waters as dark brown contrasting with "warmer" yellows.

WTMOSST.001 Sea Surface Temperature (11 micron day) [C]
(May 2005)



Other color palettes (such as "Hardcandy" or "Ocean") can provide a contouring effect. To access the alternate color palettes, first select the Custom mode in the Color Bar options section. Then select a palette from the drop-down menu where "Rainbow" appears as the default. Then "Submit Refinements". Have fun depicting your data with a few color palette "experiments" !

Winter Droughts Hit the Mid-Atlantic Region

The lack of major snowfall events during the past winter of 2008-2009 is contributing to moderate to severe droughts in the Mid-Atlantic Region, which is revealed by observations from the Tropical Rainfall Measuring Mission (TRMM) satellite (Figure 1). In Virginia, the northern, the southeast and the far western areas experienced 60% - 80% below normal precipitation. In other areas, winter precipitation ranges between 40% to 60% below normal.

The precipitation history in the Mid-Atlantic region is complicated. The satellite data in the past 10 years (Figure 2) show that the region is experiencing a downward trend in precipitation. Prior to this period, the region experienced a very weak upward trend between 1966 and 1999 (Figure 3), and a downward trend before that (Figure 4). Past studies indicate that the regional precipitation can be influenced by many factors, such as, El Niño/Southern Oscillation (ENSO), North Atlantic Oscillation, North Pacific Oscillation, and the Arctic Oscillation. Additional studies are likely needed to explain the recent downward trend.

Figure 1 was generated by Giovanni-TOVAS (TRMM Online Visualization and Analysis System). The trend plots were generated by using the TOVAS-generated ASCII data which can be easily imported to Microsoft Excel for further analysis. TRMM 3B43 is a monthly global (50° S - 50° N) merged satellite and rain gauge product that is widely used for agricultural monitoring and other activities. The Willmott-Matsuura global precipitation data is a historical global gauge dataset, which is also available for exploration in TOVAS.

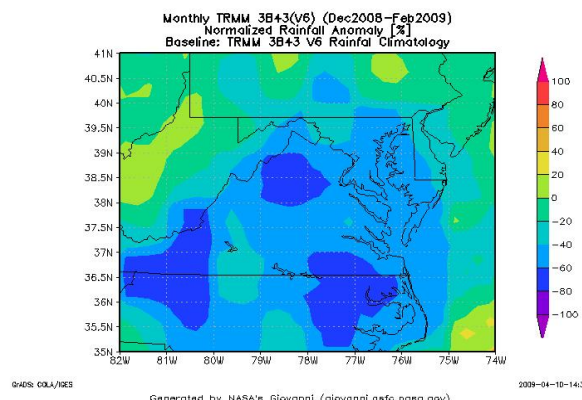


Figure 1. Normalized monthly TRMM rainfall anomaly (%), December 2008 – February 2009.

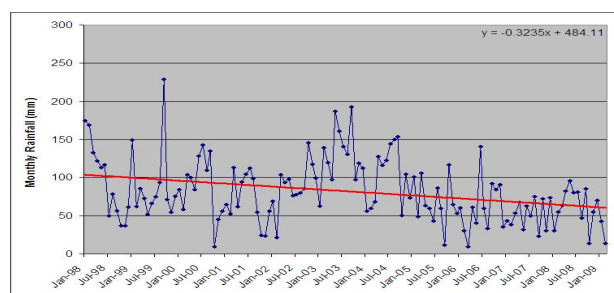


Figure 2. TRMM monthly rainfall (mm) from January 1998 to January 2009, generated with TRMM 3B43 data.

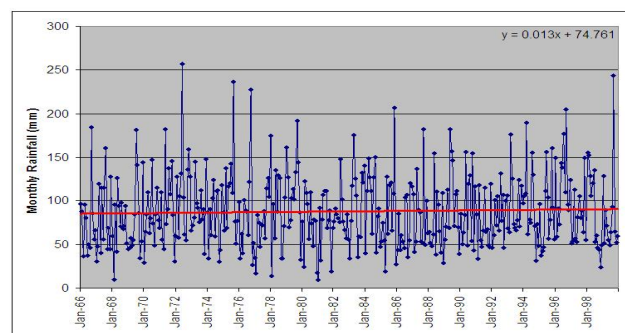


Figure 3. Time series of Willmott and Matsuura global precipitation gauge data for the same region, January 1966 – January 1999.

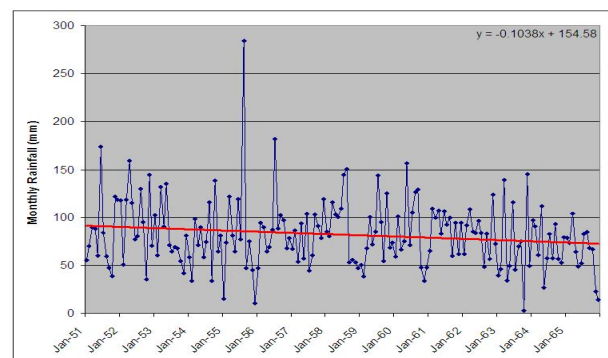


Figure 4. Time series of Willmott and Matsuura data for the same region, January 1951 – January 1966.